WHAT IS CLAIMED IS:

1. A method for reducing thick film stress of spin-on dielectric comprising the following steps:

a) spin coating a first dielectric layer on a substrate;

b) growing a liquid-phase-deposition (LPD) silica layer on the first dielectric layer; and

c) spin coating a second dielectric layer on the LPD silica layer.

2. The method according to claim 1 prior to step c) further comprising:

b') thermal curing the resulting substrate/the first dielectric layer/the LPD silica layer structure from step b).

3. The method according to claim 1 prior to step c) further comprising:

b') subjecting the LPD silica layer to a nitrogen plasma treatment or NH_3 plasma treatment.

4. The method according to claim 1, wherein the first dielectric layer has a thickness between 100 to 700 nm.

5. The method according to claim 1, wherein the second dielectric layer has a thickness between 100 to 700 nm.

6. The method according to claim 4, wherein a summation of the thickness of the first dielectric layer and a thickness of the second dielectric layer are between 800 to 1200 nm.

7. The method according to claim 1, wherein the LPD silica layer has a thickness between 5 to 100 nm.

8. The method according to claim 7, wherein the LPD silica layer has a thickness between 10 to 30 nm.

9. The method according to claim 1, wherein said first dielectric layer and said second dielectric layer are a low-K dielectric material of methyl silsesquioxane (MSQ), or hydrogen silsesquioxane (HSQ).

10. The method according to claim 9, wherein said first dielectric layer and said second dielectric layer are methyl silsesquioxane (MSQ).

11. The method according to claim 1, wherein step b) comprises immersing the substrate into a silica-supersaturated hydrofluosilicic acid (H_2SiF_6) solution to form a fluorine-containing silica layer on the first dielectric layer for a period of time.

12. The method according to claim 11, wherein the silica-supersaturated H_2SiF_6 solution is prepared by elevating a temperature of a silica-saturated H_2SiF_6 solution for 10℃ or above.

13. The method according to claim 12, wherein the temperature of the silica-saturated H_2SiF_6 solution is about 0℃, and the elevated temperature of the silica-supersaturated H_2SiF_6 solution is about 25℃.

14. The method according to claim 13, wherein the silica-saturated H_2SiF_6 solution is prepared by adding a sufficient amount of silica powder into a H_2SiF_6 solution having a concentration between 0.5-5.0 M, stirring the resulting mixture at 0℃ for a period of time, and then filtering the mixture for removal of undissolved silica powder.

15. The method according to claim 11, wherein the fluorine-containing silica layer comprises 6–10 atom% of fluorine.

16. The method according to claim 3, wherein the nitrogen plasma treatment is carried out under conditions of: 25-400℃, 10-800 mTorr, a RF power density

of 0.2-2 W/cm^2, flow rate of nitrogen gas being 100-2000 sccm, and a period of treatment time ranging from 30 sec to 2 hours; and the NH_3 plasma treatment is carried out under conditions of: 25-400℃, 10-800 mTorr, a RF power density of 0.2-2 W/cm^2, flow rate of NH_3 being 100-2000 sccm, and a period of treatment time ranging from 30 sec to 2 hours.

17. The method according to claim 11 prior to step c) further comprising:

b') subjecting the fluorine-containing silica layer to a nitrogen plasma treatment or NH_3 plasma treatment.

18. The method according to claim 17, wherein the fluorine-containing silica layer after the nitrogen plasma treatment or NH_3 plasma treatment .has 3–50 atom% of nitrogen and 0.5-10 atom% of fluorine.

19. The method according to claim 2, wherein the thermal curing in step b') is carried out in a nitrogen atmosphere at a temperature ranging from 150 to 650 ℃ for a period of 30 minutes to 2 hours.

20. The method according to claim 1 prior to the spin coating of the second dielectric layer in step c) further comprising heating and drying the LPD silica layer grown in step b).

21. The method according to claim 2 prior to the thermal curing in step b') further comprising heating and drying the LPD silica layer grown in step b).

22. The method according to claim 3 prior to the nitrogen plasma treatment or the NH_3 plasma treatment in step b') further comprising heating and drying the LPD silica layer grown in step b).

23. The method according to claim 1 after the spin coating of the second dielectric layer in step c) further comprising thermal curing the resulting

substrate/the first dielectric layer/the LPD silica layer/the second dielectric layer structure from step c).

24. The method according to claim 23, wherein the thermal curing is carried out in a nitrogen atmosphere at a temperature ranging from 150 to 650℃ for a period of 30 minutes to 2 hours.

25. A sandwich dielectric structure having a reduced thick film stress comprising:

a first dielectric layer having a thickness between 100 to 700 nm formed on a substrate;

a liquid-phase-deposition (LPD) silica layer having a thickness between 5 to 100 nm formed on the first dielectric layer; and

a second dielectric layer having a thickness between 100 to 700 nm formed on the liquid phase deposited (LPD) silica layer.

26. The structure according to claim 25, wherein said first dielectric layer and said second dielectric layer are a low-K dielectric material of methyl silsesquioxane (MSQ), or hydrogen silsesquioxane (HSQ).

27. The structure according to claim 26, wherein said first dielectric layer and said second dielectric layer are methyl silsesquioxane (MSQ).

28. The structure according to claim 25, wherein said LPD silica layer is a fluorine-containing silica layer comprising 6–10 atom% of fluorine.

29. The structure according to claim 28, wherein said LPD silica layer is a fluorine-containing silica layer and said fluorine-containing silica layer is subjected to a nitrogen plasma treatment or NH_3 plasma treatment, so that the treated fluorine-containing silica layer comprises 3–50 atom% of nitrogen and 0.5–10 atom% of fluorine.

30. The structure according to claim 25, wherein the LPD silica layer has a thickness between 10 to 30 nm.

31. The structure according to claim 25, wherein a summation of the thickness of the first dielectric layer and the thickness of the second dielectric layer are between 800 to 1200 nm.